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10/537,566	11/09/2005	Christopher Paul Revill	1316K-000028/NP	3569

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EXAMINER	
AMORES, KAREN J	

ART UNIT	PAPER NUMBER
3616	

MAIL DATE	DELIVERY MODE
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/537,566	REVILL ET AL.	
	Examiner	Art Unit	
	Karen J. Amores	3616	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *09 November 2005*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-33* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-12 and 17-33* is/are rejected.

7)☒ Claim(s) *13-16* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☒ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *03 June 2005* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *6/03/2005, 5/01/2006*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Priority

1. Applicant is advised of possible benefits under 35 U.S.C. 119(a)-(d), wherein an application for patent filed in the United States may be entitled to the benefit of the filing date of a prior application filed in a foreign country.

2. Receipt is acknowledged of papers submitted under 35 U.S.C. 119(a)-(d), which papers have been placed of record in the file.

Specification

3. The disclosure is objected to because of the following informalities: Certain numbered references in the drawings are not designated items, for example, references 185 and 186. Appropriate correction is required.

4. The drawings are objected to under 37 CFR 1.83(a). The drawings must show every feature of the invention specified in the claims. Therefore, the "roll valve provided to interconnect the compression chambers of the at least two back wheel rams" and "bump resilience volume" must be shown or the feature(s) canceled from the claim(s). No new matter should be entered.

Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement-drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as "amended." If a drawing figure is to be canceled, the appropriate figure

must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the examiner does not accept the changes, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Claim Objections

5. A series of singular dependent claims is permissible in which a dependent claim refers to a preceding claim which, in turn, refers to another preceding claim.

A claim that depends from a dependent claim should not be separated by any claim that does not also depend from said dependent claim, for example, those succeeding claim 6. It should be kept in mind that a dependent claim may refer to any preceding independent claim. In general, applicant's sequence will not be changed. See MPEP § 608.01(n).

Claim Rejections - 35 USC § 112

6. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

7. Claim 4 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

8. Claim 4 recites the limitation "bump resilience volume" in lines 10 – 12. The term is indefinite because the specification does not clearly define the term or designate a reference number in the drawings.

Claim Rejections - 35 USC § 102

9. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

10. Claims 1 – 5, 7, and 33 are rejected under 35 U.S.C. 102(e) as being anticipated by Kobayashi, U.S. 7,210,688 ("Kobayashi"). Kobayashi discloses a damping and stiffness system (fig. 1) for a vehicle suspension system for a vehicle, the vehicle including a vehicle body and a first pair and a second pair of diagonally spaced wheel assemblies, the first pair of diagonally spaced wheel assemblies including one front left wheel assembly (11) and one back right wheel assembly (14), the second pair of diagonally spaced wheel assemblies including one front right wheel assembly (12) and at least one back left wheel assembly (13), the vehicle suspension system also including front and rear vehicle resilient support means between the vehicle body

and the wheel assemblies for resiliently supporting the vehicle above the wheel assemblies, the damping and stiffness system including:

11. at least one wheel ram (11, 12, 13, and 14) located between each wheel assembly and the vehicle body, each ram including at least a compression chamber;

12. a load distribution unit interconnected between the compression chambers of the front left, front right, back left and back right wheel rams, the load distribution unit including first and second piston rod assemblies, first, second, third and fourth system volumes and first and second modal resilience volumes;

13. the first piston rod assembly defining first, second, third and fourth effective areas, the second piston rod assembly defining fifth, sixth, seventh and eighth effective areas, the first and second piston rod assemblies being located within the load distribution unit such that each piston rod assembly can rotate about and slide along a major axis of the piston rod assembly, the first effective area defines a movable wall of the first system volume such that as the first piston rod assembly slides along its major axis (45), the volume of the first system volume varies, the second effective area defines a moveable wall of the second system volume, the third effective area defines a movable wall of the first modal resilience volume, the fourth effective area defines a movable wall of the second modal resilience volume, the fifth effective area defines a movable wall of the third system volume such that as the second piston rod assembly slides along its major axis (35), the volume of the third system volume varies, the sixth effective area defines a moveable wall of the fourth system volume, the seventh effective area defines a movable wall of the first modal resilience volume, and the eighth effective area defines a movable wall of the second modal resilience volume,

14. the first system volume increasing in volume proportionately to the decrease in volume of the second system volume with motion of the first piston rod assembly, the third system volume increasing in volume proportionately to the decrease in volume of the fourth system volume with motion of the second piston rod assembly, the volume of the first modal resilience volume decreasing proportionately to the increase in volume of the first and third system volumes with motion of the first and second piston rod assemblies, the volume of the second modal resilience volume decreasing proportionately to the increase in volume of the second and fourth system volumes,.

15. the first and fourth system volumes being connected to the compression chambers of the wheel rams associated with one of the pairs of diagonally spaced wheel assemblies, the second and third system volumes being connected to the compression chambers of the wheel rams associated with the other pair of diagonally spaced wheel assemblies, the damping and stiffness system thereby providing substantially zero warp stiffness; and

16. wherein the vehicle is primarily supported by the vehicle resilient support means.

17. In reference to claims 2 – 5, 7, Kobayashi further discloses a pressure maintenance device (20, 30, and 40) connected to the first, second, third and fourth system volumes to maintain the static pressure of said system volumes at a substantially common pressure; wherein the pressure maintenance device is further connected to the first and second modal stiffness volumes to maintain the static pressure of the modal resilience volumes at substantially the same common pressure (column 9, line 54); wherein the first system volume (40A) is connected to the compression chamber of the at least one wheel ram associated with the one front left wheel assembly, the second system volume (30B) is connected to the compression chamber of the one

wheel ram associated with the at least one back left wheel assembly, the third system volume (40B) is connected to the compression chamber of the at least one wheel ram associated with the one front right wheel assembly, and the fourth system volume (30A) is connected to the compression chamber of the at least one wheel ram associated with the at least one back right wheel assembly, the first modal resilience volume thereby being a front resilience volume and the second modal resilience volume thereby being a back resilience volume, the front and back resilience volumes thereby providing the damping and stiffness system with additional pitch resilience, independent of the roll and heave stiffness of the damping and stiffness system (column 7, line 30); or wherein the second system volume (40B) is connected to the compression chamber of the one wheel ram associated with the one front right wheel assembly, the third system volume (30B) is connected to the compression chamber of the one wheel ram associated with the one back left wheel assembly, the first modal resilience volume (B) thereby being a left roll resilience volume and the second modal resilience volume (A) thereby being a right roll resilience volume, the left and right roll resilience volumes thereby providing the damping and stiffness system with additional roll resilience, independent of the pitch and heave stiffness of the damping and stiffness system.

18. In reference to claim 7, Kobayashi further discloses a first pair of axially aligned primary chambers (40) and a second pair of axially aligned primary chambers (30), each primary chamber including a piston separating each primary chamber into two secondary chambers, a first rod (45) connecting the pistons of the two first primary chambers, forming a first piston rod assembly, and a second rod (35) connecting the pistons of the two second primary chambers forming a second piston rod assembly, one of the secondary chambers (40B) in the first pair of

primary chambers being a front left system chamber and being connected to the compression chamber of a front wheel ram on a left side of the vehicle, the other secondary chamber (40A) in the first pair of primary chambers which varies in volume in the same direction as the front system chamber with motion of the first piston rod assembly, being a first right roll chamber, one of the secondary chambers in the first pair of primary chambers which varies in volume in the opposite direction to the front left system chamber with motion of the first piston rod assembly being a front right system chamber and being connected to the compression chamber of the other front wheel ram on a right side of the vehicle, the other secondary chamber (40B) in the first pair of primary chambers which varies in volume in the same direction as the front right system chamber with motion of the first piston rod assembly, being a first left roll chamber, one of the secondary chambers (30B) in the second pair of primary chambers being a back left system chamber and being connected to the compression chamber of a back wheel ram on the left side of the vehicle, the other secondary chamber (30A) in the second pair of primary chambers which varies in volume in the same direction as the back left system chamber with motion of the second piston rod assembly, being a second right roll chamber, one of the secondary chambers (30A) in the second pair of primary chambers which varies in volume in the opposite direction as the second front system chamber with motion of the second piston rod assembly being a back right system chamber and being connected to the compression chamber of a back wheel ram on the right side of the vehicle, the other secondary chamber (30B) in the second pair of primary chambers which varies in volume in the same direction as the back right system chamber with motion of the second piston rod assembly, being a second left roll chamber, and the first and

second left roll chambers being interconnected forming a left roll volume (B) and the first and second right roll chambers being interconnected forming a right roll volume (A).

19. In reference to claim 33, Kobayashi further discloses resilient centering devices (36 and 46) to provide a centering force on the piston rod assemblies in the load distribution unit to bias the piston rod assemblies towards a mid-stroke position.

20. Claims 1 – 6, 8 – 12, 17, 24, 25, 27 – 29, and 33 are rejected under 35 U.S.C. 102(b) as being anticipated by Heyring et al. U.S. 6,270,098 ("Heyring"). Heyring discloses a damping and stiffness system (fig. 1) for a vehicle suspension system for a vehicle, the vehicle including a vehicle body and a first pair and a second pair of diagonally spaced wheel assemblies, the first pair of diagonally spaced wheel assemblies including one front left wheel assembly and one back right wheel assembly, the second pair of diagonally spaced wheel assemblies including one front right wheel assembly (2) and at least one back left wheel assembly (4), the vehicle suspension system also including front and rear vehicle resilient support means between the vehicle body and the wheel assemblies for resiliently supporting the vehicle above the wheel assemblies, the damping and stiffness system including:

21. at least one wheel ram (1, 2, 3, and 4) located between each wheel assembly and the vehicle body, each ram including at least a compression chamber;

22. a load distribution unit (13) interconnected between the compression chambers of the front left, front right, back left and back right wheel rams, the load distribution unit including first and second piston rod assemblies, first, second, third and fourth system volumes and first and second modal resilience volumes;

23. the first piston rod assembly defining first, second, third and fourth effective areas, the second piston rod assembly defining fifth, sixth, seventh and eighth effective areas, the first and second piston rod assemblies being located within the load distribution unit such that each piston rod assembly can rotate about and slide along a major axis of the piston rod assembly, the first effective area defines a movable wall of the first system volume such that as the first piston rod assembly slides along its major axis (34), the volume of the first system volume varies, the second effective area defines a moveable wall of the second system volume, the third effective area defines a movable wall of the first modal resilience volume, the fourth effective area defines a movable wall of the second modal resilience volume, the fifth effective area defines a movable wall of the third system volume such that as the second piston rod assembly slides along its major axis (35), the volume of the third system volume varies, the sixth effective area defines a moveable wall of the fourth system volume, the seventh effective area defines a movable wall of the first modal resilience volume, and the eighth effective area defines a movable wall of the second modal resilience volume,

24. the first system volume increasing in volume proportionately to the decrease in volume of the second system volume with motion of the first piston rod assembly, the third system volume increasing in volume proportionately to the decrease in volume of the fourth system volume with motion of the second piston rod assembly, the volume of the first modal resilience volume decreasing proportionately to the increase in volume of the first and third system volumes with motion of the first and second piston rod assemblies, the volume of the second modal resilience volume decreasing proportionately to the increase in volume of the second and fourth system volumes,

25. the first and fourth system volumes being connected to the compression chambers of the wheel rams associated with one of the pairs of diagonally spaced wheel assemblies, the second and third system volumes being connected to the compression chambers of the wheel rams associated with the other pair of diagonally spaced wheel assemblies, the damping and stiffness system thereby providing substantially zero warp stiffness; and

26. wherein the vehicle is primarily supported by the vehicle resilient support means.

27. In reference to claims 2 – 6, Heyring further discloses a pressure maintenance device (40, 41) connected to the first, second, third and fourth system volumes to maintain the static pressure of said system volumes at a substantially common pressure; wherein the pressure maintenance device is further connected to the first and second modal stiffness volumes to maintain the static pressure of the modal resilience volumes at substantially the same common pressure (column 1. line 57); wherein the first system volume (18) is connected to the compression chamber of the at least one wheel ram associated with the one front left wheel assembly, the second system volume (21) is connected to the compression chamber of the one wheel ram associated with the at least one back left wheel assembly, the third system volume (19) is connected to the compression chamber of the at least one wheel ram associated with the one front right wheel assembly, and the fourth system volume (20) is connected to the compression chamber of the at least one wheel ram associated with the at least one back right wheel assembly, the first modal resilience volume thereby being a front resilience volume and the second modal resilience volume thereby being a back resilience volume, the front and back resilience volumes thereby providing the damping and stiffness system with additional pitch resilience, independent of the roll and heave stiffness of the damping and stiffness system (column 2, line 7); or wherein the second system volume (19) is

connected to the compression chamber of the one wheel ram associated with the one front right wheel assembly, the third system volume (21) is connected to the compression chamber of the one wheel ram associated with the one back left wheel assembly, the first modal resilience volume thereby being a left roll resilience volume and the second modal resilience volume thereby being a right roll resilience volume; the left and right roll resilience volumes thereby providing the damping and stiffness system with additional roll resilience, independent of the pitch and heave stiffness of the damping and stiffness system; a first pair of axially aligned primary chambers and a second pair of axially aligned primary chambers, each primary chamber including a piston separating each primary chamber into two secondary chambers, a first rod connecting the pistons of the two first primary chambers, forming a first piston rod assembly and a second rod connecting the pistons of the two second primary chambers forming a second piston rod assembly, one of the secondary chambers in the first pair of primary chambers being a first front system chamber and being connected to the compression chamber of a front wheel ram on a first side of the vehicle, the other secondary chamber in the first pair of primary chambers which varies in volume in the same direction as the first front system chamber with motion of the first piston rod assembly, being a first back pitch chamber, one of the secondary chambers in the first pair of primary chambers which varies in volume in the opposite direction as the first front system chamber with motion of the first piston rod assembly being a first back system chamber and being connected to the compression chamber of a back wheel ram on a first side of the vehicle, the other secondary chamber in the first pair of primary chambers which varies in volume in the same direction as the first back system chamber with motion of the first piston rod assembly, being a first front pitch chamber, one of the secondary chambers in the second pair of

primary chambers being a second front system chamber and being connected to the compression chamber of a front wheel ram on a second side of the vehicle, the other secondary chamber in the second pair of primary chambers which varies in volume in the same direction as the second front system chamber with motion of the second piston rod assembly, being a second back pitch chamber, one of the secondary chambers in the second pair of primary chambers which varies in volume in the opposite direction as the second front system chamber with motion of the second piston rod assembly being a second back system chamber and being connected to the compression chamber of a back wheel ram on a second side of the vehicle, the other secondary chamber in the second pair of primary chambers which varies in volume in the same direction as the second back system chamber with motion of the second piston rod assembly, being a second front pitch chamber, and the first and second front pitch chambers being interconnected (36) forming a front pitch volume and the first and second back pitch chambers being interconnected (37) forming a back pitch volume.

28. In reference to claims 8 – 12, Heyring further discloses the wheel rams of at least the two front or the two rear wheel rams are single-acting rams (column 1, line 16); wherein each single-acting wheel ram includes a piston dividing the ram into a compression and a rebound chamber, damping being provided in the piston of the ram to provide at least a rebound damping force (fig. 1); wherein the wheel rams at one end of the vehicle are double-acting wheel rams further including a rebound chamber, the rebound chamber of each double-acting wheel ram being connected to the compression chamber of the diagonally opposite wheel ram (column 4, line 29); and wherein the compression chamber of each of the wheel rams may be in fluid communication with a respective accumulator (5, 6, 7, and 8).

29. In reference to claim 17, Heyring further discloses the front pitch volume is connected to a front pitch accumulator (40) through a front pitch damper valve (42) and the back pitch volume may be connected to a back pitch accumulator (41) through a back pitch damper valve (43), the front and back pitch accumulators provide additional pitch resilience in the stiffness and damping system.

30. In reference to claims 24 and 25, Heyring further discloses including a pressure maintenance device (40 and 41) connected to at least four of the secondary chambers in the load distribution unit by respective pressure maintenance passages; and a valve (42 and 43) in each pressure maintenance passage.

31. In reference to claims 27 – 29, Heyring further discloses the pressure maintenance device includes a fluid pressure source; or an accumulator; wherein the pressure maintenance unit is controlled to regulate the static pressure in the at least four secondary chambers to a preset pressure.

32. In reference to claim 33, Heyring further discloses resilient centering devices (74, 75, 76, and 77) to provide a centering force on the piston rod assemblies in the load distribution unit to bias the piston rod assemblies toward a mid-stroke position.

Claim Rejections - 35 USC § 103

33. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

34. Claims 18, 26, and 30 – 32 are rejected under 35 U.S.C. 103(a) as being unpatentable over Heyring in view of Kobayashi. Heyring discloses front and rear pitch damper valves, a pressure maintenance device, the pressure maintenance device including a first and second output pressure, and a fluid pressure source. Heyring does not directly disclose a variable damper valve. Kobayashi teaches a variable damper valve (26) or a restriction in the pressure maintenance passage. Kobayashi further teaches a preset pressure can be varied; a first output pressure being connected to the first front, second front, first back and second back system chambers of the load distribution unit by respective system pressure maintenance passages, the second output pressure being connected to the front pitch volume, and the back pitch volume by respective pressure maintenance passages (fig. 1); and the preset pressures being variable to vary the roll stiffness of the damping and stiffness system separately to the pitch stiffness. It would have been obvious for a person having ordinary skill in the art at the time of the invention to modify Heyring such that it discloses a variable pressure in view of the teachings of Kobayashi so as to suppress bouncing of the vehicle body and mitigate shock from the road surface (column 6, line 4) and maintain vehicle height in accordance with load (column 8, line 24).

Allowable Subject Matter

35. Claims 13 – 16 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Conclusion

References considered pertinent to Applicants' disclosure are listed on form PTO – 892 and cited in their entirety.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Karen J. Amores whose telephone number is (571)-272-6212. The examiner can normally be reached on Monday through Friday, 8:00 AM - 5:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Paul Dickson can be reached on (571)-272-6669. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Karen J. Amores
Examiner
Art Unit 3616

8/29/2007

KJA
28 August 2007

TOAN TO
PATENT EXAMINER

8/29/07